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**EPA**

**everybody's problem:  
hazardous waste**





**Waste Alert! A Citizen's Introduction to Public Participation in Waste Management (SW-800)**

**What Is Waste Alert? (SW-814)**

**Operating a Recycling Program: A Citizen's Guide (SW-830)**

**Source Separation/Waste Reduction (SW-832)**

**Cleaning Up America's Dumps: State Solid Waste Management Plans Under RCRA (SW-831)**

**Public Participation Requirements for Federal, State, and Local Agencies (SW-833)**

**Solid Waste Management Programs under RCRA (SW-834)**

**Hazardous Waste Facts (SW-737)**

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**COVER:** Cleanup operations underway at 'Valley of the Drums,' an uncontrolled hazardous waste disposal site in Kentucky. The drums strewn about the site are being stacked in rows. Trenches were dug to catch rainwater runoff and any leaking chemical waste and to divert the liquid to settling ponds and a temporary treatment system.

# everybody's problem: hazardous waste

Every year, billions of tons of solid wastes are discarded in the United States. These wastes range in nature from common household trash to complex materials in industrial wastes, sewage sludge, agricultural residues, mining refuse, and pathological wastes from institutions such as hospitals and laboratories.

The U.S. Environmental Protection Agency (EPA) estimates that in 1980 at least 57 million metric tons of the nation's total wasteload can be classified as hazardous. Unfortunately, many dangerous materials that society has "thrown away" over recent decades have endured in the environment — making household words of 'Love Canal' and 'Valley of the Drums.' These two incidents are not unique. EPA has on file hundreds of documented cases of damage to life and the environment resulting from the indiscriminate or improper management of hazardous wastes. The vast majority of cases involve pollution of ground water — the source of drinking water for about half of the U.S. population — from improperly sited or operated landfills and surface impoundments (pits, ponds, and lagoons). In addition to polluting ground water, the improper handling or disposal of hazardous waste can cause several other kinds of environmental damage, as illustrated by these case histories (often involving more than one form of damage) from EPA records.

## Hazardous waste can pollute ground water:

- The water supplies of Toone and Teague, Tennessee, were contaminated in 1978 with organic compounds

What appears to be a pleasant rural landscape actually hides ground water contaminated by a nearby industrial landfill. The ground water was the source of water for the towns of Toone and Teague, Tennessee.







A young man was asphyxiated as he discharged hazardous waste from his truck into this open pit in Iberville Parish, Louisiana.

when water leached from a nearby landfill. When the landfill closed, about 6 years earlier, the site held some 350,000 drums, many of them leaking pesticide wastes. Because the towns no longer have access to uncontaminated ground water, they must pump water in from other locations.

- Ground water in a 30-square-mile area near Denver was contaminated from disposal of pesticide waste in unlined disposal ponds. The waste, from manufacturing activities of the U.S. Army and a chemical company, dates back to the 1943-to-1957 period. Decontamination, if possible, could take several years and cost as much as \$80 million.

### **Hazardous waste can contaminate rivers, lakes, and other surface water:**

- At least 1,500 drums containing waste, primarily from metal-finishing operations, were buried near Byron, Illinois, for an unknown number of years until about 1972. Surface waters (and soil and ground water as well) were contaminated with cyanides, heavy metals, phenols, and miscellaneous other materials. Wildlife, stream life, and local vegetation were destroyed. The disposal site suffered long-range damage from the toxic pollutants that drained into the soil.
- About 17,000 drums littered a 7-acre site in Kentucky — which became known as 'Valley of the Drums' — about 25 miles south of Louisville. Some 6,000 drums were full, many of them oozing their toxic contents onto the ground. In addition, an undetermined quantity of hazardous waste was buried in drums and subsurface pits. In 1979, EPA analyses of soil and surface water in the drainage area identified about 200 organic chemicals and 30 metals.

### **Hazardous waste can pollute the air:**

- In 1972, waste containing hexachlorobenzene (HCB), one of the family of toxic organic compounds that contains chlorine, was disposed of in a landfill near Darrow and Geismar, Louisiana. The HCB vaporized and subsequently accumulated in cattle over a 100-square-mile area. The cattle had to be destroyed, representing a direct economic loss of over \$380,000. Elevated, although subtoxic, levels of HCB in blood plasma were found in some area residents.

**When industrial wastes ignite, they not only present the immediate dangers of heat and smoke but can also spread harmful particles over wide areas.**







Hazardous waste was stored in large tanks and drums at this disposal site in Chester, Pennsylvania. Waste had also been dumped directly on the ground, forcing EPA personnel inspecting the site to wear protective clothing and carry air tanks as precautionary measures.





- A truck driver was killed in 1978 as he discharged waste from his truck into one of four open pits at a disposal site in Iberville Parish, Louisiana. He was asphyxiated by hydrogen sulfide produced when liquid wastes mixed in the open pit. The area was surrounded by water and had a history of flooding.

### **Hazardous waste can burn or explode:**

- A fire broke out in 1978 at a disposal site in Chester, Pennsylvania, where 30,000 to 50,000 drums of industrial waste had been received over a 3-year period. The smoke forced closing of the Commodore Barry Bridge and 45 firemen required medical treatment, mostly as a result of lung and skin irritation from chemical fumes. A number of homes are located within three blocks of the site; drummed waste was kept only 20 feet from a natural gas storage tank and liquefied natural gas tanks were about 100 yards away. Waste was emptied directly on the soil of the 3-acre site; some probably drained to the tidal section of the adjacent Delaware River. Waste may even have been dumped into the river.
- A bulldozer operator was killed in a 1975 explosion at a landfill in Edison Township, New Jersey, as he was burying and compacting drums of unidentified chemical waste. Of the 200 truckloads of waste the landfill received daily, about 50 were industrial waste.

### **Hazardous waste can poison via the food chain:**

- In 1970, three children in an Albuquerque, New Mexico, family became seriously ill after eating a pig that had been fed corn treated with a mercury

An explosion at this New Jersey landfill killed a bulldozer operator as he buried and compacted drums of unidentified hazardous wastes.





Boarded-up houses offer  
mute testimony of the  
environmental disaster  
at Love Canal in Niagara  
Falls, New York.



compound. Local health officials found several bags of similarly treated corn in the community dump.

- Over a 4-month period in 1976, an Indiana family consumed milk contaminated with twice the maximum concentration of polychlorinated biphenyls (PCBs) considered safe by the Food and Drug Administration. The milk came from the family's cow, which had been grazing in a pasture fertilized with the City of Bloomington's sewage sludge. The sludge contained high levels of PCBs from a local manufacturing plant. A Federal law passed in 1976 banned production of PCBs after January 1, 1979.

#### **Hazardous waste can poison by direct contact:**

- The health of some residents of Love Canal, near Niagara Falls, was seriously damaged by chemical waste buried a quarter of a century ago. As drums holding the waste corroded, their contents percolated through the soil into yards and basements, forcing evacuation of over 200 families in 1978 and 1979. About 80 chemicals, a number of them suspected carcinogens, were identified.
- In 1979, cattle on a Kansas farm were contaminated with PCBs after waste oil was used in animal backrubbers. The waste oil (from electrical transformers) had been purchased from a salvage yard in

After being contaminated with PCBs, many cattle on a farm in Kansas had to be destroyed and buried in this EPA-approved site.









Hazardous waste was illegally disposed of into this buried tank by a "midnight dumper," who was observed entering the property by an eyewitness. Notified of the dumping, the Michigan Department of Natural Resources had to dig up the property to locate the tank, which was leaking and contaminating the soil and ground water.

1972, before the effects of PCBs were widely known. Products from 54 head of cattle had been shipped to a number of States and had to be traced and disposed of properly; another 112 head had to be destroyed. The farm and a feedlot where the cattle had been shipped were also contaminated.

These examples provide dramatic evidence of damage to life and the environment from mismanagement of hazardous waste. It was in large part to prevent such tragedies that, in 1976, Congress enacted Subtitle C of the Resource Conservation and Recovery Act (RCRA), Public Law 94-580. This law imposes strict controls over the management of hazardous waste throughout its entire life cycle. The costs for proper environmental controls will be higher than amounts spent in the past to manage these wastes. But the astronomical costs of cleaning up damage caused by poor disposal practices should be eliminated. An ounce of prevention, in this instance, is a sound investment.

An EPA study made in 1979 indicated that cleaning up abandoned hazardous waste sites and those operating under environmentally unsound conditions could cost as much as \$44 billion, only part of which is likely to be paid for by the owners of the sites. The remainder would have to come from other sources. But in many cases it is impossible to assign dollar values to the long-term harm to health and the environment that has resulted from improper management of hazardous waste.

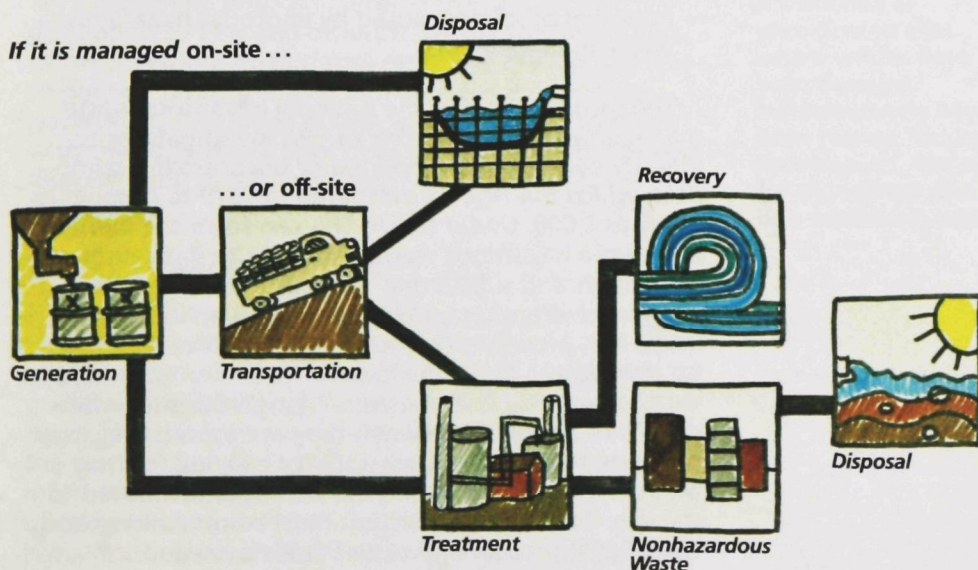


## The National Program To Control Hazardous Waste

In a report to Congress in 1973, EPA recommended passage of a Federal law to regulate the handling of hazardous waste. EPA reported that although existing Federal legislation was adequate to protect the air, surface waters, and oceans from improper disposal of hazardous waste, there were no national controls over its disposal on land. Moreover, the air and water pollution laws requiring industry to adopt environmentally acceptable treatment and disposal practices had increased the amounts of hazardous waste being dumped on the land, a relatively unregulated outlet for disposal. Thus, a law was needed to close the circle of Federal environmental protection by providing, for the first time, control over disposal of hazardous waste on land.

Congress responded by including hazardous waste provisions in RCRA — the law that established a national program to protect human health and the environment from improper handling of solid waste and to encourage conservation of natural resources. Directed by RCRA to take the lead in developing strict controls, EPA began a three-pronged effort to attack the nation's hazardous waste problem.

The first phase, the regulatory program under RCRA, is intended to help States prevent any Love Canals in the future. Central to this program is a national "cradle-to-grave" control system to track all significant



**A Hazardous Waste Will Be Tracked From "Cradle-to-Grave"**



quantities of hazardous waste from wherever it is generated to its final disposal. The regulatory program includes:

- identification of hazardous waste
- standards for generators and transporters of hazardous waste
- performance, design, and operating requirements for facilities that treat, store, or dispose of hazardous waste
- a system for issuing permits to such facilities
- guidelines describing conditions under which State governments can be authorized to carry out their own hazardous waste management programs

Along with its authority under RCRA, EPA is using regulatory authorities under several other Acts it administers. These include the Clean Water Act, the Safe Drinking Water Act, the Toxic Substances Control Act, and the Refuse Act. Under certain provisions of these Acts, EPA has been able to:

- fund the development of programs for management and enforcement of hazardous waste activities by State and local governments
- fund cleanup of disposal sites
- approve landfills and incinerators for PCB disposal and treatment
- provide technical assistance to State and local officials to help them analyze and remedy existing or potential problems caused by improper hazardous waste management

The second phase of the national hazardous waste management effort consists of EPA investigations to identify dangerous abandoned or uncontrolled dump sites, which the Agency estimated in 1979 to number as many as 2,000. Under RCRA, EPA can force the owner to clean up a hazardous waste disposal site if it causes an "imminent and substantial" danger to human health and the environment. EPA has stepped up its efforts under this provision to discover, investigate, and clean up abandoned disposal areas.

Unfortunately, the owners of dangerous sites often cannot be found. Even when they are found, they may not have the finances necessary for cleanup, or they may deny any legal liability for damages attributed to the site. Thus innocent victims must resort to long and costly legal proceedings under State laws, and government agencies are faced with cleanup expenses.

The third phase of the attack on hazardous waste is a





1979 legislative proposal, termed the "superfund," developed by EPA and others to rectify the limitations of the imminent hazard provision. The main purpose is to provide funds that will permit Federal and State governments to move quickly and effectively to deal with the consequences of uncontrolled and abandoned disposal sites, as well as spills of oil and hazardous substances.

### **The Public Role**

Of special importance in RCRA is a provision stating that "public participation in the development, revision, implementation, and enforcement of any regulation, guideline, information, or program under this Act shall be provided for, encouraged, and assisted" by EPA and the States. This booklet is an example of the kind of information EPA makes available to the public. It is intended to help build an understanding of the hazardous waste problem and thus promote effective public participation in the development of Federal and State programs for bringing the problem under control.

Abandoned or uncontrolled sites where wastes have been dumped indiscriminately have been termed "ticking time bombs." The search for abandoned sites will be a continuing process.



## a hazardous waste is . . .

RCRA defines a hazardous waste as a solid waste that may cause or significantly contribute to serious illness or death, or that poses a substantial threat to human health or the environment when improperly managed. Hazardous wastes are among the leavings of a highly technological society and come from many segments of that society—industry, hospitals, research laboratories, and all levels of government. Industry is by far the largest source, generating these wastes to manufacture cars, fuel, paper, plastics, clothing, rubber, paint, pesticides, medicines, and a host of other products that Americans need or expect in their day-to-day lives.

Working from the RCRA definition, EPA has compiled and proposed a list of hazardous wastes. Listing is the most common method for defining hazardous waste in European countries and in some State laws. EPA has also proposed that a hazardous waste be identified by testing it to determine if it possesses any one of four characteristics. If it does, it will be subject to regulation under RCRA. Three of the characteristics selected by EPA produce acute effects likely to cause almost immediate damage; the fourth creates chronic effects most likely to appear over a longer time period. The four characteristics are:

- **Ignitability**, which identifies wastes that pose a fire hazard during routine management. Fires not only present immediate dangers of heat and smoke but also can spread harmful particles over wide areas.
- **Corrosivity**, which identifies wastes requiring special containers because of their ability to corrode standard materials, or requiring segregation from other

Materials that corrode and escape from their containers pose a threat to health and the environment.



## The products we use . . .

## The potentially hazardous waste they generate . . .

Plastics	→	Organic chlorine compounds
Pesticides	→	Organic chlorine compounds, organic phosphate compounds
Medicines	→	Organic solvents and residues, heavy metals (mercury and zinc, for example)
Paints	→	Heavy metals, pigments, solvents, organic residues
Oil, gasoline, and other petroleum products	→	Oil, phenols and other organic compounds, heavy metals, ammonia salts, acids, caustics
Metals	→	Heavy metals, fluorides, cyanides, acid and alkaline cleaners, solvents, pigments, abrasives, plating salts, oils, phenols
Leather	→	Heavy metals, organic solvents
Textiles	→	Heavy metals, dyes, organic chlorine compounds, solvents

wastes because of their ability to dissolve toxic contaminants.

- **Reactivity** (or explosiveness), which identifies wastes that, during routine management, tend to react spontaneously, to react vigorously with air or water, to be unstable to shock or heat, to generate toxic gases, or to explode.
- **Toxicity**, which identifies wastes that, when improperly managed, may release toxicants in sufficient quantities to pose a substantial hazard to human health or the environment.

Several of the methods used to test for the characteristics are identical to those used by the U.S. Department of Transportation in its program to control transport of hazardous materials.

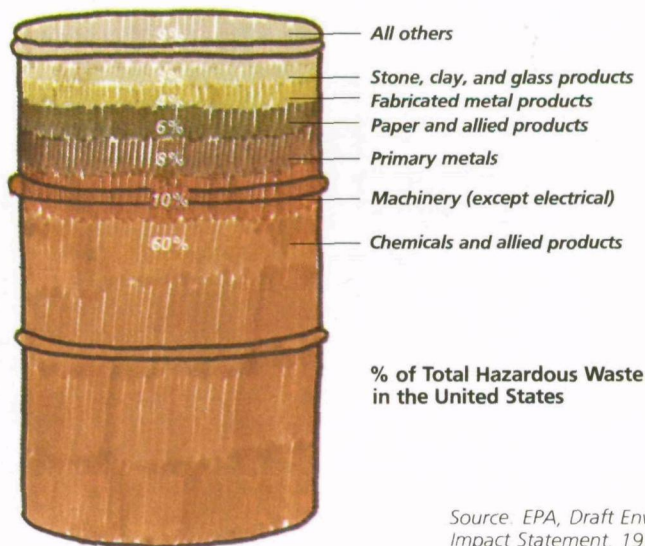
EPA may add to or delete from the list of hazardous wastes or characteristics identifying a hazardous waste. Any changes will be published in the *Federal Register*, and the public will be given an opportunity to comment on proposed changes.



## Some Facts About Hazardous Waste

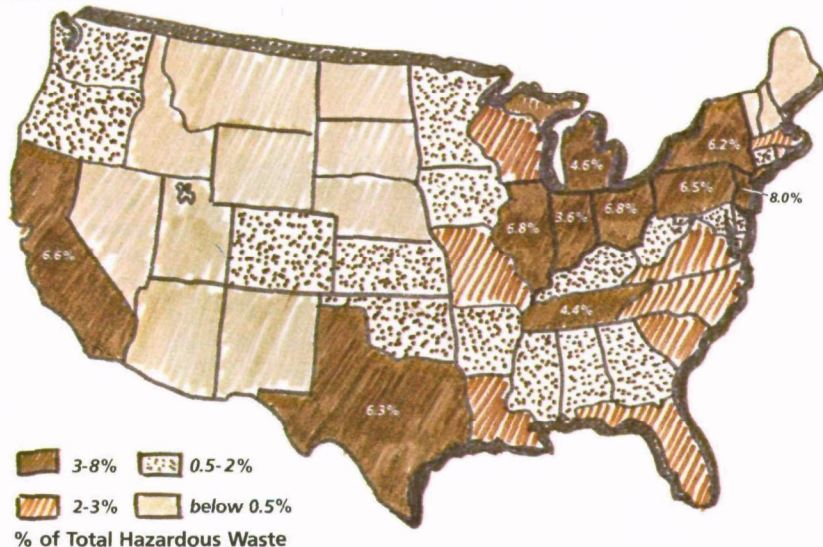
Understanding problems related to managing hazardous waste requires much detailed information, including the kinds and quantities of waste generated, where they are generated, how they are managed, and costs of managing them properly. Accurate information of such a broad scope is difficult to obtain. Inaccuracies result from inconsistencies in data sources, overgeneralizations, and variations in actual wastes generated within industrial groups; however, the figures presented here

**The chemicals and allied products industry generates 60 percent of industrial hazardous waste:**



Source: EPA, Draft Environmental Impact Statement, 1979.

**Geographically, hazardous waste tends to be concentrated in certain regions. About 60 percent is generated in 10 States: New Jersey, Illinois, Ohio, California, Pennsylvania, Texas, New York, Michigan, Tennessee, and Indiana.**

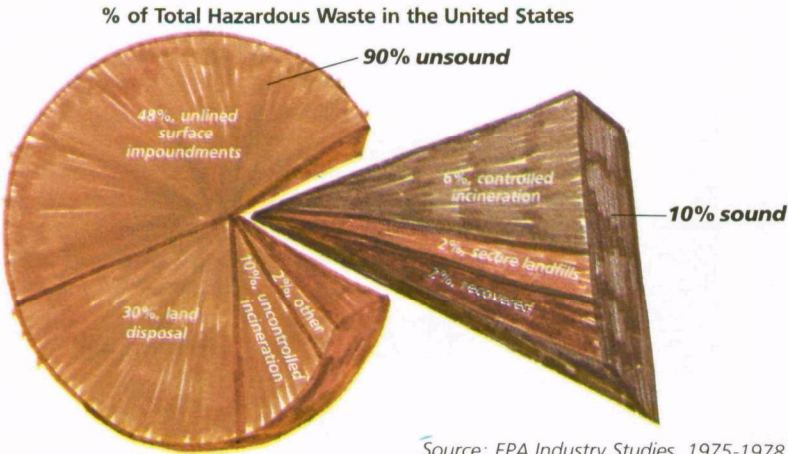


Source: EPA, Draft Environmental Impact Statement, 1979.

were the best available when this booklet was published. As new and improved data are collected, EPA's figures will be revised and made available to the public; meanwhile, these data provide a realistic basis for understanding the hazardous waste problem in the United States.

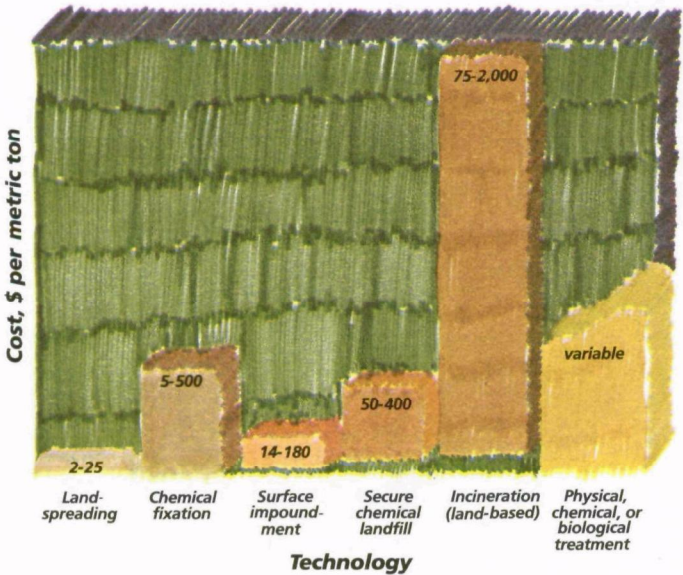
Generation of hazardous waste by U. S. manufacturing industries in 1980 is estimated at 57 million metric tons (wet) — over half of this is from the chemical industry, a broad industrial category that produces such common materials as plastics, synthetic fibers, synthetic rubber, fertilizers, medicines, detergents, soaps, cosmetics, paints, pigments, adhesives, pesticides, and explosives, as well as numerous other organic and inorganic chemicals used by various industries.

**Most hazardous waste is disposed of by environmentally unsound methods:**



Source: EPA Industry Studies, 1975-1978.

**Environmentally sound technologies are available for treatment and disposal of hazardous waste. Costs vary widely, according to type and volume of waste handled, and are substantially in excess of unsound practices:**



Source: EPA, Draft Economic Impact Analysis, 1979.





## **good management: there are better ways**

The Love Canal tragedy, contamination of ground water in Toone, the dumping of PCBs along North Carolina's roads, the thousands of drums piled high in Kentucky's 'Valley of the Drums,' and similar incidents served to focus attention on what can happen when hazardous waste is improperly managed. Although technologies exist for environmentally sound management, they have not been widely used because of their higher costs and because there was no legal requirement for their use.

Proper management means more than just careful disposal. It means consideration of a range of options that depend upon such factors as characteristics, volume, and location of the waste. In order of priority, the desired options for managing hazardous waste are:

- minimize the amounts generated by modifying the industrial process involved
- transfer the waste to another industry that can use it
- reprocess the waste to recover energy or materials

Incineration can be carried out in a manner that will protect the environment ...



- separate hazardous from nonhazardous waste at the source and concentrate it, which reduces handling, transportation, and disposal costs
- incinerate the waste, or subject it to treatment that makes it nonhazardous
- dispose of the waste in a secure landfill (one that is located, designed, operated, and monitored — even after it is closed — in a manner that protects life and the environment)

Transferring a hazardous waste to another industry is an option that is receiving increasing attention. Operating on the principle that one company's waste may be another's raw material, this option can take two forms: the materials exchange, which is equipped to handle, treat, and physically exchange wastes and the information exchange, which acts only as a clearinghouse, leaving generator and potential purchasers to negotiate directly.

The first information exchange started in The Netherlands in 1972. Since then, the idea has spread quickly in Europe and is beginning to spread in the United States. At least 20 information exchanges and 3 materials exchanges are now in operation in the United States. The first information exchange in the United States was established in 1975 by the St. Louis Regional Commerce and Growth Association. Typically, information ex-



... or it can be carried out carelessly without adequate environmental safeguards.



changes are run by chambers of commerce or other nonprofit groups. In contrast, materials exchanges are usually operated by profit-oriented private concerns.

Probably only a small percentage of hazardous waste is suitable for exchange. Purer, less-contaminated wastes stand the best chance of being exchanged. Also, waste is more likely to be exchanged where the purchaser is in the same or a nearby locality, which minimizes transportation costs. The waste exchange, though not a panacea, makes a valuable contribution by reducing the amounts of material to be managed by less desirable options.

Related to the exchange option is the recovery of energy or materials. With shortages of raw materials and tighter restrictions on disposal of wastes, recovery will become a more viable alternative. Many wastes contain valuable basic ingredients. And the extraction of materials from concentrated wastes requires less energy — and generates less water and air pollution — than the mining and processing of virgin materials. Consequently, when energy or materials are recovered from hazardous waste, natural resources are conserved and the environment is protected.

Incineration is a proven method of destroying organic waste without posing a threat to the environment. EPA has conducted a number of research and field-scale projects on incineration methods for chemical wastes. Two successful projects carried out in 1979 involved several types of commercial incinerators and 20 different chemical wastes, including 9 pesticides. These wastes were almost totally detoxified or destroyed. The successful use of cement kilns to destroy chlorine- or bromine-containing organic waste — which is very toxic because it resists degradation and accumulates in living tissues — is one of the more important results of EPA's demonstration project. The chlorine or bromine in the waste reduces the alkalinity of the residue left after combustion, simplifying disposal. The heat value of the

In EPA studies, this industrial incinerator was successful in almost totally destroying DDT; it has also been able to destroy transformer oils containing PCBs.



waste also replaces some of the fuel needed to manufacture cement.

Another promising approach to disposing of chlorine- or bromine-containing organic waste is to burn it at sea aboard special incinerator ships. This technique, pioneered in Europe, has been used on several occasions by the United States, including the disposal of the Air Force's surplus stock of Herbicide Orange, the defoliant used in Vietnam. The incineration was aboard a Dutch vessel, the *Vulcanus*. The possibility of building American incinerator vessels is being considered.



Three kinds of processes can be used to render a hazardous waste less hazardous or nonhazardous:

- **physical processes**, such as carbon or resin adsorption, distillation, centrifuging, flocculation, sedimentation, reverse osmosis, and ultrafiltration
- **chemical processes**, such as fixation into solids that are more readily disposed of, neutralization, ion exchange to remove heavy metals, oxidation, and precipitation
- **biological processes**, such as activated sludge treatment to destroy organic compounds, composting of organic-rich wastes, trickling filters to promote decomposition, and controlled application on land ("landfarming") to degrade organic compounds

These various options can reduce the amounts of hazardous waste that must be disposed of directly on land, a crucial concern because the land available for disposal is decreasing, while waste tonnages are increasing. The hazardous waste management industry, major waste-generating industries, and EPA are devoting increased attention to development of new, improved, and less expensive treatment technologies. But even with new technology, some hazardous waste will always be destined for land disposal.

A Dutch vessel, the *Vulcanus*, can incinerate hazardous organic wastes at sea. This disposal method is controlled in the United States under the Marine Protection, Research, and Sanctuaries Act.





Although sound management technologies exist, 90 percent of the hazardous waste generated is still being disposed of improperly as in this old strip mine.



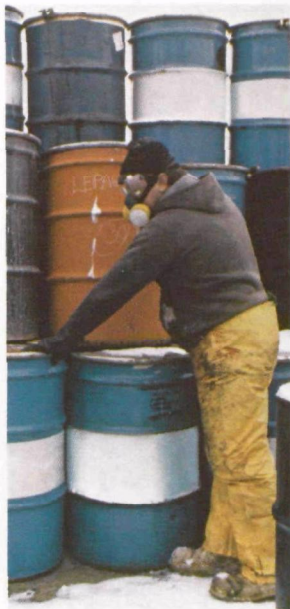
## **bad management = environmental disasters**

Sound technologies may be available to manage hazardous wastes, but EPA studies of 17 industries between 1975 and 1978 indicate that they are not being used for 90 percent of the waste generated. The predominate practice is disposal in unlined impoundments (pits, ponds, and lagoons) and landfills. Up to 80 percent of hazardous waste is disposed of on the generator's property.

The least expensive environmentally sound method of disposal is a secure landfill; however, only a limited number of secure landfills are in operation in the United States. Many commercial incinerators pollute the air when they burn hazardous waste. Dumping at sea, an inexpensive alternative for companies holding the required EPA permits, will be sharply reduced in 1981 when all provisions of the 1972 Marine Protection, Research, and Sanctuaries Act are in effect. The cheapest alternative of all is the "midnight dumper." With only a truck and a total disregard for public safety, midnight dumpers can take hazardous waste off generators' hands for relatively modest fees and then dispose of it in any one of a number of ways — flushing it into sewers and ditches, dumping it in lakes and rivers, dropping it off ships at sea, burying it in farmland, concealing it in municipal waste for disposal in sanitary landfills, and storing or dumping it on open lots or fields.

The common practice of open storage has led to some of the most damaging incidents caused by mismanagement of hazardous waste — the 'Valley of the Drums' and a site in Lowell, Massachusetts, being flagrant examples. The Lowell site dates back to 1970, when a private corporation was set up to salvage and reprocess waste from area industries. In 1977, the company declared bankruptcy, leaving some 20,000 barrels, many rusted and leaking, containing 1 million gallons of toxic waste. Some of the barrels were only a few hundred feet from a stream that flows into the Concord River, a tributary to the Merrimack. Several communities get their drinking water from the Merrimack. Another 250,000 to 300,000 gallons were left in leaking storage tanks. This 5.2-acre site was located only a few hundred yards from some residences in the Town of Lowell. With the company bankrupt, the State of Massachusetts had to appropriate \$1.5 million to clean up the site.

Drums were stored in the open at this site in Lowell, Massachusetts. The company that operated the site went bankrupt, leaving the State of Massachusetts with the formidable task of clean up.

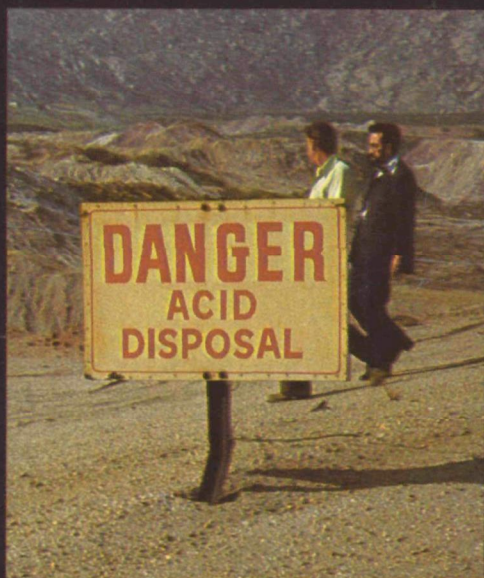






The goal of the new national program to control hazardous waste is to prevent environmentally unsound disposal practices such as those shown here.







# **RCRA: moving toward a safer environment**

Harm to human health and the environment caused by past mismanagement of hazardous waste led to incorporation in RCRA of a "cradle-to-grave" control system. This system calls for regulation of hazardous waste from the time it is first generated through transport to final treatment or disposal. The concept uses a pathways approach, so-called because the movement of hazardous waste destined for storage, treatment, or disposal is constantly monitored and controlled. This approach is basically different from that used to regulate air and water pollution, where specific standards are tailored for each industrial category. The pathways approach was chosen because hazardous waste is mobile and can be disposed of at locations far from where it was generated. In contrast, sources of industrial air and water pollution are fixed and relatively easy to identify.

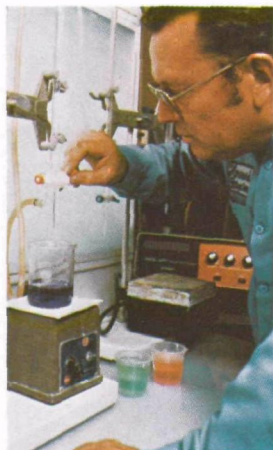
The Congress intended that the individual States develop their own hazardous waste control systems, subject to EPA approval. To receive approval, the State program must be equivalent to the national regulatory program developed by EPA. EPA handles the program only in States that choose not to implement their own programs or that fail to get approval.

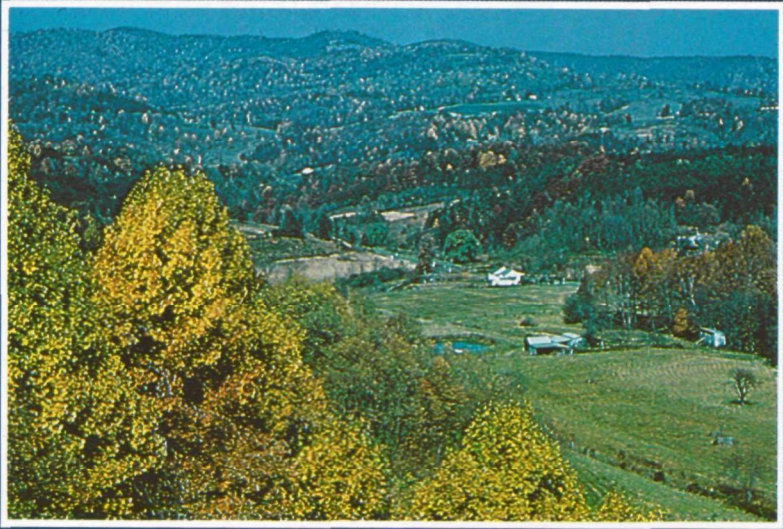
EPA has developed and proposed a set of six regulations to control all stages of the hazardous waste management cycle, whether the waste is managed "on-site" (at the point of generation) or transported to an "off-site" waste management facility. Promulgation of all of the hazardous waste regulations in final form was scheduled for 1980, to take effect 6 months later. Proposed regulations are always subject to change; therefore, the following discussion focuses on basic requirements under the Act.

## **Generators**

Those who generate potentially hazardous waste in their operations are required to determine if the waste is hazardous under the RCRA definition. Thus, the definition of hazardous waste is the cornerstone of the national regulatory program. Once a waste is identified as hazardous, RCRA requires that all significant quantities be tracked throughout their life cycle by means of

Under RCRA regulations, companies that generate wastes may test them to determine if they are hazardous.





Protection of the environment is the primary goal of the Resource Conservation and Recovery Act. This law provides for Federal assistance to States to develop and enforce their own hazardous waste management programs, subject to EPA approval.



a transport manifest and by stringent recordkeeping and reporting requirements. In order to identify a waste as hazardous, the generator refers to a list of wastes or tests the waste against the characteristics in the final regulations. Or, the generator may simply declare the waste is hazardous. Generators disposing of their waste on-site must be issued a permit but would not need a manifest because no transportation is involved.

Generators are the key link in the transport control system. Under the proposed RCRA regulation, they must:

- originate a transport manifest, describing the amount, composition, origin, routing, and destination of each shipment
- use approved containers and label them properly
- select a responsible company to transport the waste
- specify the facility to which the waste is to be delivered and assure that it has a valid permit
- confirm that a waste reaches the intended facility
- keep records of information in the manifest and report it to an authorized State or to EPA
- notify authorities of international shipments

Transporters of hazardous waste play a key role in the "cradle-to-grave" control system of tracking hazardous waste from the generator to the disposer.

## Transporters

Transporters must deliver hazardous waste shipments to the facility designated by the generator, keep appropriate records, and report any spills enroute. Hazardous



waste transporters do not need permits in the Federal system, but some States require transporters to register.

Many of the major problems in the past have been caused by irresponsible actions of some transporters. After being paid to take hazardous waste to disposal facilities, they have instead merely dumped the waste indiscriminately, without regard for the effects of their actions. For example, the sewage treatment plant in Louisville, Kentucky, had to be shut down for several months in 1977 after a local transporter dumped several tons of pesticide waste into the sewer system. During the clean-up, which cost Federal, State, and local agencies \$3 million, raw sewage had to be discharged directly into the Ohio River. The manifest system is designed to prevent such practices because generators can quickly notify authorities if the designated facility does not receive a shipment.

Some portions of the RCRA regulation on transporters overlap with provisions of the Hazardous Materials Transportation Act (HMTA) administered by the U. S. Department of Transportation (DOT). Regulations issued under HMTA have been amended to make them more compatible with the RCRA regulation, thus avoiding duplication of administrative and enforcement activities. Overlapping provisions of the two Acts, covering labeling, packaging, and placarding of hazardous waste by generators, are being administered similarly. EPA and DOT jointly enforce regulations when they share authority. EPA regulations take effect if DOT lacks authority.

## **Standards and Permits for Facilities**

Owners and operators of facilities that treat, store, or dispose of hazardous waste must comply with minimum standards for assuring that the facilities operate safely. These standards cover containing, testing, and destroying wastes so that they cannot contaminate ground water, surface water, or the atmosphere. There are also standards for safety and emergency measures to be used if hazardous waste is accidentally discharged, for training of personnel in emergency situations, and for keeping records and filing reports. Owners and operators of facilities are also required to demonstrate financial responsibility for their operations.

The owner of a hazardous waste facility must apply for a permit within a specified time. Under the RCRA regulation, the applicant must provide information on the site and the amounts and types of hazardous waste to be handled. To receive a permit, an applicant must meet the standards set for the specific type of facility.



The permit describes the terms, conditions, and schedules of compliance, as well as monitoring, recordkeeping, and reporting requirements.

Many procedures of the permit program under RCRA are similar to permit requirements under other EPA-administered laws. The Agency has consolidated these programs into one set of regulations. EPA's objective is to move in the direction of processing an applicant's hazardous waste permit simultaneously with any other required permits. EPA's consolidated permit program includes:

- the hazardous waste management program under RCRA
- the underground injection control program under the Safe Drinking Water Act
- the national pollutant discharge elimination system under the Clean Water Act
- the dredge or fill program under the Clean Water Act
- the program for prevention of significant deterioration of air quality under the Clean Air Act

### **State Hazardous Waste Programs**

States must be authorized by EPA to conduct their own hazardous waste management programs. In order to receive authorization, the State program must be equivalent to the national program. Among other things, the State must have legislation and regulations that are no less stringent than the Federal standards, and the State must show that it has the resources to administer and enforce the program. If a State's program does not fully comply with EPA requirements, EPA may grant the State interim authorization for 2 years, during which time the program should be further developed to meet all authorization requirements.

**State and local governments have important responsibilities in handling environmental emergencies. Denver's fire department includes a hazardous materials response team and stages mock drills (*bottom photo*) to improve its emergency operations.**





## key problem areas

As EPA continues to develop the national program for hazardous waste management, key issues are surfacing. One is the very scope of the program. Some 700,000 generators, transporters, treaters, storers, and disposers of hazardous waste must notify EPA of their activities and, thus, be brought into the program. Contacting these individuals and informing them of the new RCRA requirements called for development of complex administrative procedures within the Agency's headquarters and regional offices.

Another issue involves the interstate movement of hazardous waste. Some States believe that the U.S. Constitution allows them to ban the disposal of waste originating in other States. This approach runs counter to the concept of large regional hazardous waste facilities which, by drawing wastes from several States, could operate at lower costs than smaller facilities. State importation bans could also discourage private investment in new facilities, thus leading to a shortage of acceptable facilities to accommodate all the hazardous waste being regulated under RCRA. The issue of importing waste is politically and emotionally charged and may take years to fully resolve. However, in 1978 the U.S. Supreme Court ruled that certain types of State waste import bans are a restraint on interstate commerce and, therefore, unconstitutional.

Citizen opposition to the siting of facilities in their communities is another problem. In fact, a facility in Illinois, with valid State permits, was closed down by court order in September 1978 as a result of local opposition. The citizens' role in the new regulatory program is of ultimate importance, not only from the environmental viewpoint but for the continued prosperity of their communities. Without support by citizens to site new waste treatment, storage, and disposal facilities, conveniently located for industry, some industries generating hazardous waste may choose to locate elsewhere. Lack of citizen involvement and support for effective hazardous waste management can thus have an adverse economic impact upon communities.

The requirement of financial responsibility for owners and operators of hazardous waste facilities is still another concern. In the past, some owners took in large quantities of hazardous waste for treatment, storage, or disposal, but then declared bankruptcy or simply abandoned the site without adequately disposing of the waste. State and local governments were then faced with cleaning up the site at taxpayers' expense. RCRA's financial requirements could force some small

operators out of business, thus adding to the problem of insufficient capacity. However, RCRA provides that existing facilities may obtain interim status before a permit is issued. This period can be viewed as a safety valve while the program is starting up.

## **informing and involving the public**

Successful development and implementation of the national hazardous waste regulatory program depend upon public support, which, in turn, depends upon public understanding of the many complex technical, political, social, and economic issues involved. RCRA provides several mechanisms that afford the public an opportunity to assume an active role in the program and seek to increase public understanding of hazardous waste issues.

### **Public Hearings and Meetings**

RCRA directs that public hearings and meetings be held by agencies—Federal and State—during the development, revision, implementation, and enforcement of activities required under the Act. This is to assure that the public has an opportunity to understand and comment on significant issues and that the agency gives full consideration to those comments in making final decisions. The regulations developed by EPA reflect a careful analysis and integration of the comments received in the public participation stages. As

Public hearings and meetings are among several mechanisms that afford citizens opportunities to take an active part in RCRA programs. Other mechanisms include citizen suits, public notification requirements, and public education and training programs.





the Federal regulations are revised and further developed, and the State hazardous waste programs are developed and implemented, citizens will have the same opportunities to participate.

### Citizen Suits

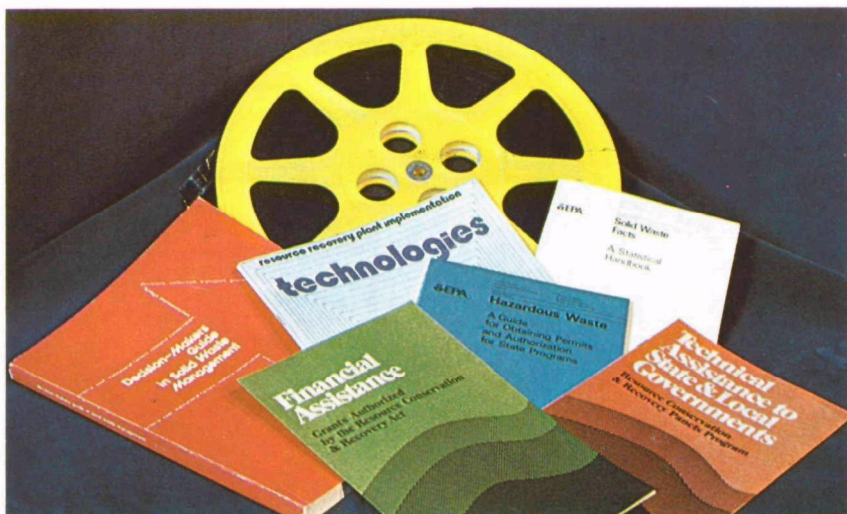
RCRA provides to citizens the right to file suit in Federal court when other means have failed. Two kinds of legal actions are possible:

- citizens suits may be brought against any person (including Federal, State, and local governments) who allegedly violates "any permit, standard, regulation, condition, requirement, or order which has become effective" under RCRA.
- citizens may request that the Federal courts review the decisions of the EPA Administrator on final regulations.

### Public Information

The public must be informed if it is to participate constructively in the decisionmaking process. To assure citizens an opportunity to become well informed, RCRA requires EPA to develop and disseminate information on solid waste management. In carrying out this directive, EPA's Office of Solid Waste produces a variety of technical reports and other information and makes them available to the public free of charge. All materials produced by the Office since 1966 are listed in *Available Information Materials on Solid Waste Management*. This catalog is thoroughly indexed by subject and updated periodically.

Information materials help citizens to gain an understanding of solid waste issues. With this knowledge, they can participate effectively in decisions that, in the past, were made largely by technical experts.



Another RCRA provision calls for EPA to develop and implement citizen training programs. Since 1972, EPA has made grants to civic, scientific, environmental, and consumer groups and labor unions for informational activities on solid waste problems. In 1979, EPA launched a long-term public information program. Funded by EPA grants, the program **Waste Alert!** was undertaken by the American Public Health Association (as coordinator), the Environmental Action Foundation, the League of Women Voters Education Fund, the National Wildlife Federation, the Technical Information Project, and the Izaak Walton League of America. With their national memberships and supporters, plus the knowledge acquired in earlier EPA public education programs, the coalition is well qualified to reach a national audience.

**Waste Alert!** has four goals:

- to stimulate public support for effective management of solid and hazardous waste
- to help the public understand the issues and problems related to siting solid waste facilities
- to encourage citizen participation in resource conservation and recovery programs that can decrease reliance on disposal
- to promote cooperation among public health and environmental groups, State and regional waste agencies, industry, elected officials, and citizens' groups.

To achieve these goals, **Waste Alert!** began by holding conferences in all the EPA regions across the country. The objectives of this first phase of the program are:

- to identify and train citizen leaders concerning legislation affecting waste management
- to assure that the public has the opportunity to understand official programs and proposed actions and that the government fully considers the public's concerns
- to keep the public informed about significant issues and proposed changes in projects or programs
- to assist in planning for State conferences and encourage information programs at the local level

The second phase of **Waste Alert!** consists of workshops at the State and local community levels.

EPA launched *Waste Alert!*, a major citizen participation program, in 1979, with a conference in New Orleans. Under this long-range program, a series of conferences is being held across the country to involve citizens in solid waste issues.





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## To be part of the solution to the hazardous waste problem —

- recognize that we are all part of the problem — hazardous waste inevitably results from the production of the many material goods that help Americans to enjoy a high standard of living
  - reduce the amount of materials we waste — this will not only reduce the quantities of hazardous waste generated, but will also conserve natural resources, reduce solid waste disposal problems, and save us money
  - understand the many complexities of the hazardous waste problem — EPA, public interest groups, and State and local governments are sources of information
  - participate
    - join **Waste Alert!** by writing to EPA, by working with a local group already concerned with solid and hazardous waste issues, or by getting an existing organization to expand its program to address such issues
    - take advantage of the many opportunities RCRA provides for the public to participate
  - recognize that there are no easy solutions
- 

This abandoned disposal site in Deerfield, Ohio, discharged chemical waste to a stream which flows into the nearby Berlin Reservoir. From 10,000 to 15,000 drums, some of which contained waste from the manufacture of



## everybody's problem

Because of the many times in the past when hazardous waste was mismanaged out of carelessness, indifference, or ignorance, most communities resist new sites — and sometimes continuing operation of an existing site. Hazardous waste facilities share a common characteristic with many other “undesirable” neighbors — prisons, highways, airports, and sewage treatment plants, for example. No one denies the need for them, but no one wants them nearby.

The resistance to new sites exists for a variety of reasons, including lack of knowledge about hazardous waste and hazardous waste facilities (what they are and what they do); distrust of government decisions; increase in noise, truck traffic, and odor; aesthetics; potential effect on land value; uncertainty of how a community that allows a disposal facility will benefit; and the belief that the facilities may do substantial harm to human health and the environment. These fears may not be based upon the community's own experiences, but rather upon published accounts of past incidents in other locations.

New sites for treatment, processing, and disposal must be found as the national hazardous waste management program goes into effect. Some existing disposal sites must be closed if they are unable to meet

pesticides and plastics, were dumped here. The State has appropriated over \$4 million to clean up the site. An important objective of RCRA is to prevent such uncontrolled practices.





the new standards. At the same time, the tonnages requiring disposal will increase because industrial production is increasing. Moreover, wastes formerly handled by environmentally unsound and often illegal methods will have to be disposed of by sound methods in legally permitted disposal sites.

The national regulatory controls will very likely encourage conservation practices. Waste management costs generally rise as safer methods are required, which should be an incentive to reduce generation of wastes. Similarly, higher disposal costs will make resource recovery processes comparatively more economical. But in the foreseeable future, there will be some wastes that must be disposed of on land. RCRA regulations are intended to ensure that new landfill sites are located in areas that are geologically suitable and designed and operated to protect public health and the environment.

Pogo, the famous comic-strip character, once observed: "We have met the enemy and they are us." In terms of the nation's hazardous waste problems, Pogo might have said: "We have found the sources of hazardous waste, and they are us." The American way of life as we know it today depends upon an abundance of manufactured material goods, and their manufacture generates hazardous waste as a by-product. If we are to continue to enjoy our present lifestyle, we must begin as a nation to accept responsibility for working toward a solution of the hazardous waste problem.

Citizens and governments working together hold the key to the solution of hazardous waste problems.



**For further information contact your EPA regional solid waste office.**

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**Region 4**

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Atlanta, GA 30308  
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**Region 5**

Solid Waste Program  
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**Region 6**

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